

## REDEFINING RANGE OVERLAP BETWEEN THE SHARP-TAILED SPARROWS OF COASTAL NEW ENGLAND

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**ABSTRACT.**—With the designation of Nelson’s Sharp-tailed Sparrow (*Ammodramus nelsoni*) and Saltmarsh Sharp-tailed Sparrow (*A. caudacutus*) as species of high conservation priority in the northeastern United States, the need to document fully their abundance, distribution, and the extent of range overlap has become increasingly important. We surveyed saltmarshes in coastal New England for both species from 1997 to 2000. The current overlap zone extends from Parker River, Massachusetts, north to Weskeag River, Maine, which expands the previously reported range overlap of 48 km to 208 km. Among the 49 sites surveyed within the current overlap zone, both species were present at 25 sites. It is possible that the species have experienced range expansion over the last several decades, especially the Nelson’s Sharp-tailed Sparrow. Our findings indicate that the nominate subspecies of the Saltmarsh Sharp-tailed Sparrow warrants the greatest conservation concern given its limited geographic range, a potentially expanding hybrid zone with *A. n. subvirgatus*, and the potential for habitat degradation from an oil spill associated with the urban/industrial centers of the Northeast. Received 24 May 2001, accepted 3 February 2002.

In 1995, the American Ornithologists’ Union Committee on Classification and Nomenclature split the Sharp-tailed Sparrow (then *Ammodramus caudacutus*) into two species: the Saltmarsh Sharp-tailed Sparrow (*A. caudacutus*) in the south and the Nelson’s Sharp-tailed Sparrow (*A. nelsoni*) in the north (American Ornithologists’ Union 1995). This decision followed closely the recommendations of Greenlaw (1993) who reported differences in song, morphology, and habitat, with interbreeding limited to an overlap zone of approximately 48 km on the Maine coast (American Ornithologists’ Union 1998). Differences in habitat seem to result from the use of inland fresh and brackish marshes as well as saltmarsh habitat by Nelson’s Sharp-tailed Sparrows, and the nearly exclusive use of saltmarshes by Saltmarsh Sharp-tailed Sparrows (Erskine 1992, Greenlaw and Rising 1994). Furthermore, the coastal physiography in the southern Gulf of Maine varies from larger

marshes in the south to smaller, widely scattered marshes in the northeast (Fefer and Shetig 1980). This pattern in coastal features corresponds roughly to the recognized range boundaries of each species in Maine. In New England, however, the extent of overlap between the nominate subspecies of Saltmarsh Sharp-tailed Sparrow (*A. c. caudacutus*) and the maritime subspecies of Nelson’s Sharp-tailed Sparrow (*A. n. subvirgatus*) is not well known.

For more than a century, ornithologists have reported on the range boundaries of the *caudacutus* and *subvirgatus* populations of sharp-tailed sparrows in coastal Maine (Norton 1897; Montagna 1940, 1942; Palmer 1949; Greenlaw 1993). As early as 1940, Montagna (1940) discussed sites where *caudacutus* and *subvirgatus* co-occurred during the breeding season. Later, Greenlaw (1993) described a zone of overlap among the subspecies from Scarborough Marsh in Cumberland County, Maine, north to Popham Beach in Phippsburg, Sagadahoc County, Maine, where limited interbreeding appeared to be taking place (Greenlaw 1993, Rising and Avise 1993). However, since 1996, Nelson’s Sharp-tailed Sparrows have been reported during the breeding season south of this zone in Biddeford, York County, Maine (Brinker 1997) and at Great Bay National Wildlife Refuge, New Hampshire (G. Taylor pers. comm.). These observations, together with limited

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DNA evidence from Massachusetts (Rising and Avise 1993), raise doubts concerning the southern boundary and suggest possible expansion of the overlap zone. Prior to our study, the understanding of the distribution of sharp-tailed sparrows in coastal New England was based on skilled but intermittent observations, rather than systematic surveys. Greenlaw and Rising (1994) indicated that both local and regional surveys would document conclusively the extent of overlap between these species and would constitute a positive step toward appropriate management.

The Saltmarsh Sharp-tailed Sparrow and the *subvirgatus* race of the Nelson's Sharp-tailed Sparrow are of high conservation priority in the northeastern United States according to the Partners in Flight prioritization system (Carter et al. 2000) because large proportions of their global populations breed there (>90% for Saltmarsh Sharp-tailed Sparrow). Efforts in the U.S. to conserve these species are hampered by a lack of data regarding their distribution, abundance, and population trends, and by uncertainty over which states or agencies have jurisdiction over significant populations. As a first step in evaluating the status of these two sparrows and to provide a baseline from which to monitor population trends and future shifts in range boundaries, we examined the extent and species composition of this contact zone among saltmarshes in coastal New England.

#### STUDY AREA AND METHODS

We documented the distribution and abundance of both species of sharp-tailed sparrows along the Atlantic coast from Greenwich, Connecticut, to Lubec, Maine. We surveyed most marshes in coastal New England, but excluded small (<5 ha) marshes and patches of fringing marsh along rivers and sheltered bays. We established fixed points in each marsh and distributed them throughout the wetland as feasible given difficulties of traversing marshes (i.e., points were neither along transects nor randomly located). We positioned each point  $\geq 250$  m from all other points and  $\geq 50$  m from any upland edge. We marked each point with a 0.5-m stake flag inscribed with a unique identification number to facilitate revisiting the exact location. We identified each species by either sight or sound and counted the number of individuals of each species  $\leq 100$  m from each point during a 10-min count period. We visited most points on three occasions during the breeding season, from early June through mid-August, 1997–2000, except when prevented by extreme tidal flooding or when the point was

discontinued due to frequent listening difficulties (e.g., traffic noise) or other logistical constraints. We allowed approximately two weeks to elapse between visits to an individual point. We used two indices to express relative abundance of each species at a given site: the maximum number of individuals detected  $\leq 100$  m from a point and the percentage of points within each site where each species was present.

#### RESULTS

We surveyed 244 marshes from Maine to Connecticut with 911 total points visited. We detected Saltmarsh Sharp-tailed Sparrows at 132 (54%) marshes: 44 (58%) in Connecticut, 30 (86%) in Rhode Island, 29 (51%) in Massachusetts, three (75%) in New Hampshire, and 26 (36%) in Maine. We documented Saltmarsh Sharp-tailed Sparrows at six sites north of its published northern range limit: Popham Beach, Maine (Greenlaw 1993, American Ornithologists' Union 1995), extending this species' documented range northeastward about 65 km (Fig. 1, Table 1). Based on our survey, the northernmost site for this species was the Weskeag River estuary in South Thomaston, Knox County, Maine. We did not detect Saltmarsh Sharp-tailed Sparrows at any of the 30 marshes surveyed north of this site to Lubec, Maine, on the Canadian border.

We encountered Nelson's Sharp-tailed Sparrows at 54 sites from Lubec, Maine, to Parker River National Wildlife Refuge, Massachusetts. This included 13 occupied sites south of the former range boundary, indicating a southward range extension of approximately 95 km (Fig. 1, Table 1). We did not detect Nelson's Sharp-tailed Sparrows at 165 marshes from Parker River south to Greenwich, Connecticut.

Range boundaries were not abrupt for either species. Instead, the percentage of points with each species present (an index to abundance) declined gradually at marshes near the edge of each species' geographic range (Table 1). Among the 11 sites surveyed within the former overlap zone, seven marshes (64%) were occupied by both species and one marsh (9%) by only Nelson's Sharp-tailed Sparrows. We did not detect sharp-tailed sparrows of either species at any of the three (27%) remaining marshes. Within the current overlap zone of 49 sites, we found at least one species at 35 sites (71%), both species at 25 sites (51%), and neither species at 14 sites (29%; Table 1).

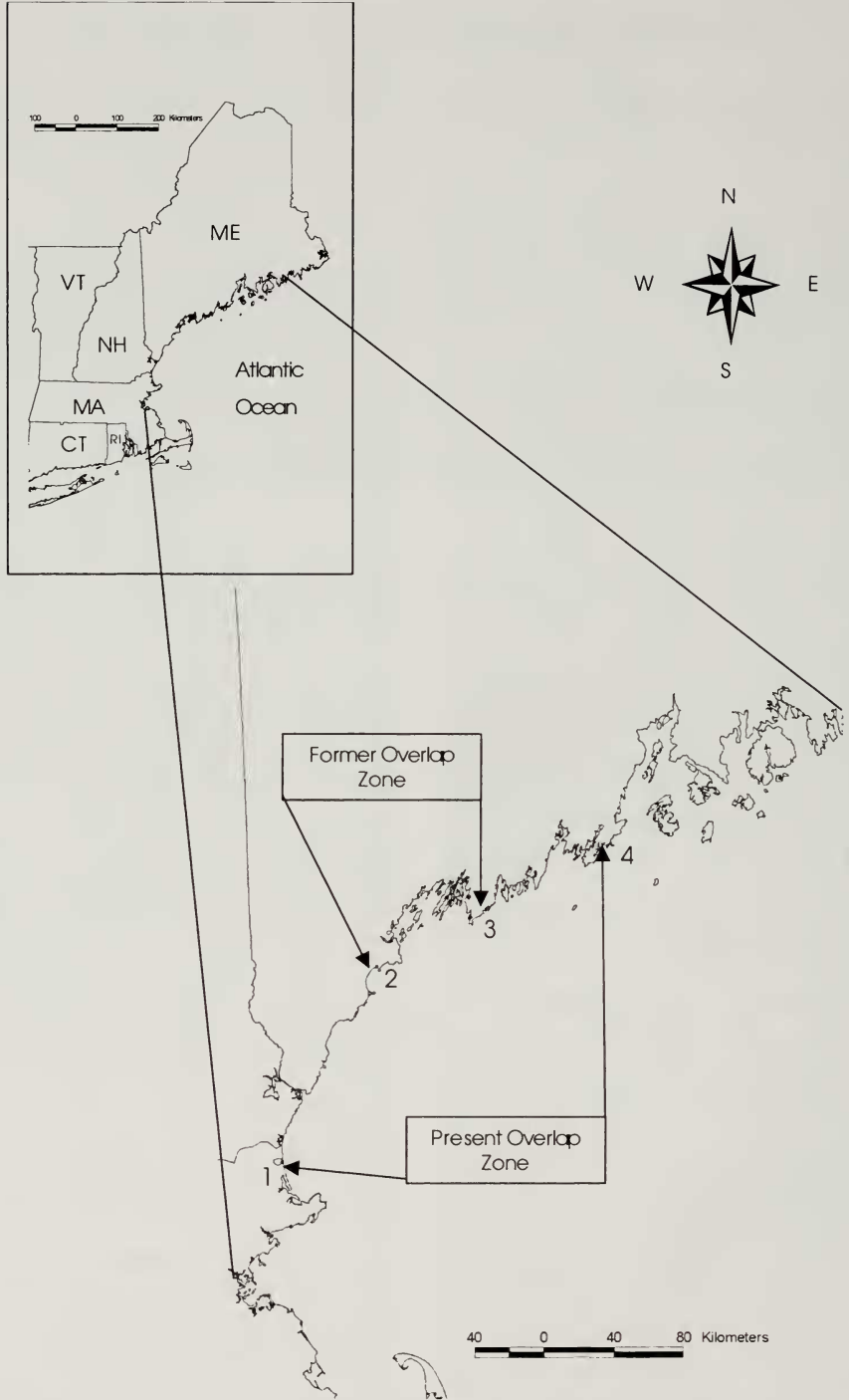


FIG. 1. Range overlap of Saltmarsh Sharp-tailed Sparrow and Nelson's Sharp-tailed Sparrow in coastal New England, based on point counts conducted June through August, 1997–2000. Numbers correspond to sites discussed in text: (1) Parker River, (2) Scarborough Marsh, (3) Popham Beach, (4) Weskeag River.

TABLE 1. Indices of abundance of Nelson's and Saltmarsh sharp-tailed sparrows among 49 saltmarshes in coastal New England, based on 10-min, 100-m radius point counts conducted June through August, 1997–2000. Sites are arranged from north to south. Names in bold are sites within the previously known overlap zone. Saltmarsh Sharp-tailed Sparrows were not detected at 30 marshes north of Weskeag River, Maine, and Nelson's Sharp-tailed Sparrows were not detected at 165 marshes south of Parker River, Massachusetts.

State	Site	Number of points	Maximum number of individuals per point		Percentage of points with species present	
			Nelson's	Saltmarsh	Nelson's	Saltmarsh
Maine	Weskeag River <sup>a</sup>	20	7	5	90	60
	Friendship	2	0	0	0	0
	Havener Cove <sup>b</sup>	1	0	0	0	0
	Meetinghouse Cove <sup>b</sup>	3	0	0	0	0
	Western Branch <sup>b</sup>	2	0	0	0	0
	Broad Cove South <sup>b</sup>	2	0	0	0	0
	Greenland Cove <sup>b</sup>	1	0	0	0	0
	Deer Meadow Brook	10	4	2	80	10
	Dyer River	9	14	6	89	33
	Maine Yankee	2	0	0	0	0
	Chewonki Creek	2	0	0	0	0
	Montsweag Brook	4	0	0	0	0
	Reid State Park	6	6	1	83	50
	Little Riv. (Georgetown)	10	6	3	100	50
	West Georgetown	2	1	0	50	0
	Newtown/Minot Creeks	10	5	2	90	50
	<b>Popham Beach</b>	10	9	3	90	50
	<b>Sprague River<sup>a</sup></b>	12	8	4	75	25
	<b>Small Point</b>	3	0	0	0	0
	<b>Mare Brook</b>	5	11	7	100	80
	<b>Maquoit Bay</b>	6	4	1	83	17
	<b>East Harspswell</b>	2	0	0	0	0
	<b>Cousins River</b>	10	3	2	80	40
	<b>Presumpscot River</b>	4	3	0	25	0
	<b>Fore River</b>	2	0	0	0	0
	<b>Spurwink River<sup>a</sup></b>	24	7	5	50	50
	<b>Scarborough Marsh<sup>a</sup></b>	76	10	8	82	74
	Goosefare Brook	4	5	8	100	100
	Saco River	4	1	0	25	0
	Biddeford Pool	7	2	2	57	71
	Little River (Biddeford)	5	4	6	40	100
	Batson River <sup>a</sup>	12	5	6	58	50
	Sampson Cove <sup>a</sup>	3	0	1	0	33
Kennebunk River	3	4	2	66	33	
Mousam River	5	0	1	0	20	
Little River (Wells)	5	1	1	20	60	
Webhannet River	36	4	12	47	58	
Ogunquit River <sup>a</sup>	19	8	7	74	58	
Upper York River <sup>a</sup>	10	2	6	60	50	
York River Tributaries <sup>c</sup>	3	0	0	0	0	
Braveboat Harbor <sup>a</sup>	12	0	1	0	8	
Crescent Surf	3	0	3	0	100	
New Hampshire	Hampton River	18	0	3	0	39
	Little River (Hampton)	4	0	0	0	0
	Luberland Creek	2	0	9	0	100
Massachusetts	Chapman's Landing	5	6	3	60	100
	Blackwater River	10	2	12	40	90
	Salisbury Beach	2	0	4	0	50
	Parker River <sup>a</sup>	40	1	10	3	78

<sup>a</sup> Surveyed for two breeding seasons.

<sup>b</sup> Small sites along the Medomak River.

<sup>c</sup> Dolly Gordon Brook, Cider Hill Creek, and Boulter Pond Brook.

## DISCUSSION

We think our measure of the overlap in distribution of these two species is accurate because we detected Saltmarsh Sharp-tailed Sparrows at the northernmost occupied site (Weskeag River) during every year visited (1997, 1998, and 2000), yet failed to detect them at the next site to the north (Mendall Marsh) during both 1998 and 1999 (not visited in 1997 or 2000). Furthermore, given the number of sites occupied by Saltmarsh Sharp-tailed Sparrows north of Popham Beach ( $n = 6$ ) and similarly for Nelson's Sharp-tailed Sparrows south of Scarborough Marsh ( $n = 13$ ), and the abundance of individuals of both species on specific point counts (Table 1), each species appears well established outside the former overlap zone.

The distribution of saltmarshes in coastal New England is not uniform and may influence the range boundaries of these sparrows. Marshes within the Gulf of Maine differ greatly in size, shape, and proximity from one another, with large expansive marshes shifting to small isolated marshes with increasing latitude (Fefer and Shettig 1980). Montagna (1942) and Palmer (1949) implied that this transition from large to smaller marshes has influenced the distribution of sharp-tailed sparrows. Furthermore, the ecological differences imposed by small, scattered marshes, which predominate in northeastern coastal Maine, in contrast to the large, nearly contiguous marshes found in southern New England, are likely to affect these species differently.

Habitat availability probably is not the primary determinant of the southern boundary for Nelson's Sharp-tailed Sparrows, because the southern terminus occurs in Massachusetts amid several large marshes in close proximity to one another. Instead, competition or some other environmental factor may be dictating the southern extent of Nelson's Sharp-tailed Sparrow. It is noteworthy that this southern boundary occurs at the northern extent of the congener, and possible ancestor, the Seaside Sparrow (*A. maritimus*; Zink and Avise 1990). Post and Greenlaw (1994) described aggressive interactions between sharp-tailed and Seaside sparrows where the latter often evicts sharp-tailed sparrows from territories and dominate interactions in feeding areas outside

of territories. Such interspecific competition may contribute to the southern range extent of Nelson's Sharp-tailed Sparrow. Furthermore, with such limited foliage height diversity in the high marsh, perhaps there is only enough niche space for two ecologically similar species, although Nelson's Sharp-tailed Sparrows apparently breed successfully within the narrow marsh/upland interface at sites with great tidal range in the Bay of Fundy.

For the Saltmarsh Sharp-tailed Sparrow, however, habitat may be more important in defining its northern range limit. This species appears to use brackish (and certainly fresh) marshes less than Nelson's Sharp-tailed Sparrow (Greenlaw and Rising 1994), and the marsh along the Weskeag River is the last "true" saltmarsh with >150 ha of emergent marsh habitat for over 100 km northeast along the Maine coast. Penobscot Bay, an area which contains few marshes and little *Spartina*-dominated habitat, reaches its southwestern extreme <10 km from the mouth of the Weskeag River. Penobscot Bay may represent a barrier to effective colonization of the few larger marshes to the northeast.

Our data document the presence of each species outside previously accepted range boundaries and seem to indicate an expansion by both species. However, it also is possible that these species may have been present, but undetected for decades by birders. This is not unlikely for Saltmarsh Sharp-tailed Sparrows, given their faint "complex whisper song" and lack of an obvious flight display (Greenlaw 1993). This species could have been overlooked for decades in marshes north of Popham Beach. Less likely, however, is the failure to detect Nelson's Sharp-tailed Sparrows at sites south of Scarborough Marsh, given the large number of skilled observers and the sparrow's more obvious flight display and primary song (Greenlaw 1993).

Further monitoring is needed to determine whether the ranges of each species currently are expanding. The implications of two potentially expanding populations with a broadening hybrid zone may place increasing emphasis on the conservation of *A. c. caudacutus*, whose habitat use is inextricably linked with tidal marshes and whose range (outside the overlap zone) extends only from Massachusetts to New Jersey. Furthermore, catastrophic

events such as a large oil spill in this area of dense human population or a rise in sea level could greatly affect global population size of both species, but especially *A. c. caudacutus*.

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